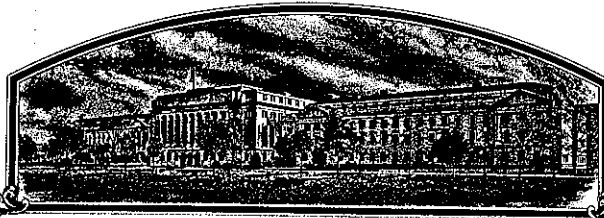


No.

8900089



# THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

**Western Plant Breeders, Inc.**

Whereas, THERE HAS BEEN PRESENTED TO THE

**Secretary of Agriculture**

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS BY THE OWNER OF THE RIGHTS. (34 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

BARLEY

'Winchester'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D. C. this 30th day of August in the year of our Lord one thousand nine hundred and ninety-one.

Attest

*Kenneth Evans*  
Commissioner  
Plant Variety Protection Office  
Agricultural Marketing Service

*Ed Madigan*  
Secretary of Agriculture



U.S. DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE

FORM APPROVED: OMB NO. 0581-0055

## APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) Western Plant Breeders, Inc		2. TEMPORARY DESIGNATION BFC-78-40	3. VARIETY NAME Winchester
4. ADDRESS (Street and No. or R.F.D. No., City, State, and Zip Code) 8111 Timberline Dr. Bozeman, Montana 59715		5. PHONE (Include area code) (406) 587-1218	FOR OFFICIAL USE ONLY VPVO NUMBER 8900089
6. GENUS AND SPECIES NAME <u>Hordeum vulgare</u>	7. FAMILY NAME (Botanical) Graminea		FILING DATE <u>Feb. 7, 1989</u> TIME <u>11:00</u> <input checked="" type="checkbox"/> A.M. <input type="checkbox"/> P.M.
8. KIND NAME Barley	9. DATE OF DETERMINATION Aug. 1, 1984		FEES RECEIVED AMOUNT FOR FILING \$ <u>1800.00</u> DATE <u>Feb. 7, 1989</u> AMOUNT FOR CERTIFICATE \$ <u>200.00</u> DATE <u>July 30, 1991</u>
10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.) Corporation			12. DATE OF INCORPORATION Sept. 27, 1985
11. IF INCORPORATED, GIVE STATE OF INCORPORATION Maryland			
13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS. Dr. Dale R. Clark and Craig R. Cook 8111 Timberline Drive Bozeman, Montana 59715 PHONE (Include area code): (406) 587-1218			

## 14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED

- a. ☒ Exhibit A, Origin and Breeding History of the Variety (See Section 52 of the Plant Variety Protection Act.)  
b. ☒ Exhibit B, Novelty Statement.  
c. ☒ Exhibit C, Objective Description of Variety (Request form from Plant Variety Protection Office.)  
d. ☒ Exhibit D, Additional Description of Variety.  
e. ☒ Exhibit E, Statement of the Basis of Applicant's Ownership.

## 15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? (See Section 83(a) of the Plant Variety Protection Act.)

☒ Yes (If "Yes," answer items 16 and 17 below) ☐ No

## 16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?

☐ Yes ☒ No

## 17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?

☐ Foundation ☐ Registered ☐ Certified

## 18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?

☐ Yes (If "Yes," give date)☒ No

## 19. HAS THE VARIETY BEEN RELEASED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES?

☒ Yes (If "Yes," give names of countries and dates)☐ No

Canada as Certified Seed in April of 1988.

## 20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT

DATE

Dr. Dale R. ClarkFeb 3, 1989

SIGNATURE OF APPLICANT

DATE

Craig R. CookFeb 3, 1989

## WINCHESTER

14a.

Winchester (BFC-78-40) was selected by Western Plant Breeders from the cross, Gus X Kombar. A single F2 plant was selected in the summer of 1977 in Western Plant Breeders' nursery near Conrad, MT. An F3 row was grown at Conrad in the summer of 1978 and five single plant selections from this row were planted as F4 plots near Chandler, AZ in the fall of 1978. Uniform F4 plots were harvested, bulked and given the experimental number BFC-78-40. This seed was used to plant an observation nursery near Conrad, MT in the spring of 1979. Subsequent generations of this line were yield tested in nurseries located in Idaho, Washington, Montana, Oregon, California, and the provinces of Alberta, Saskatchewan, and Manitoba in the years 1980, 1981, 1982, 1983, 1984, 1985, and 1986. Plants were selected from the F9 bulk in 1984 and 200 plant plots were planted near Bozeman, MT in the spring of 1985. Uniform plant plots were harvested and bulked in September of 1985 and the resultant bulk was seeded near Scottsdale, AZ in the fall of 1985. The resulting production was harvested as Breeders seed and designated "Winchester". This seed was shipped to Western Plant Breeders' associated seed company, the Alberta Wheat Pools, in May of 1986 for the production of Foundation seed. Winchester was formally registered and licensed (#2677) in Canada by the Plant Health and Plant Products Directorate on July 11, 1986. Certified seed of Winchester was first offered for sale in April of 1988.

Winchester is a stable and uniform variety in appearance and performance across several generations and growing conditions. Agronomic data to support this stability are presented in tables I-a thru I-e.

## WINCHESTER

14b.

Winchester is a long-awned, six-rowed, semidwarf spring barley. The plant growth type of Winchester is most similar to Kombar. However, Winchester is 0-4 inches taller than Kombar, and Winchester is 4 days earlier than Kombar. Also the test weight of Winchester is 3 lbs/bu higher than Kombar. The above comparisons along with the complete objective description (14c.) show Winchester to be a novel variety of barley.

14d.

An additional description of Winchester, along with data produced from nurseries in Canada are included. This material was used for the official registration of Winchester in Canada. (pages 11 - 16)

14e.

Western Plant Breeders, Inc. is the employer of the breeders and rightfully therefore the owner of "Winchester".

## W I N C H E S T E R

Table I-a. Yield in pounds per acre of Winchester and presently grown varieties in Western Plant Breeders' spring barley trials.

<u>Year</u>	<u>Location</u>	<u>Winchester</u>	<u>Gus</u>	<u>Kombar</u>	<u>WestBred Gustoe</u>	<u>Steptoe</u>
1980	Conrad, MT	5423	4402	-	-	5104
	Nampa, ID	4961	4710	-	-	5464
	Tremonton, UT	5460	4620	-	-	4480
1981	Conrad, MT	5626	4176	-	5364	5568
	Nampa, ID	6050	6100	6300	6500	5850
	Tremonton, UT	3850	4100	6000	5900	3650
1982	Conrad, MT	5345	4532	5229	4880	5403
	Nampa, ID	4966	5069	5632	4966	4864
	Burley, ID	7322	6810	6912	7475	6656
	Merrill, OR	6593	6033	6593	6780	6966
1983	Bozeman, MT	5568	4408	3828	4234	4988
	Burley, ID	6960	6612	6322	7482	5684
	Moses Lake, WA	5576	5406	6316	6373	5975
1985	Bozeman, MT	7656	6786	-	7134	7656
	Burley, ID	5278	5568	-	5104	5916
	Yakima, WA	7219	7475	-	7680	7219
	Steptoe, WA	<u>4930</u>	<u>3944</u>	<u>-</u>	<u>4698</u>	<u>5510</u>
17 location average		5811	5338	-	-	5703

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## W I N C H E S T E R

Table I-b. Plant height in inches of Winchester and presently grown varieties in Western Plant Breeders' spring barley trials.

<u>Year</u>	<u>Location</u>	<u>Winchester</u>	<u>Gus</u>	<u>Kombar</u>	<u>WestBred Gustoe</u>	<u>Steptoe</u>
1980	Nampa, ID	28	27	-	-	35
	Tremonton, UT	27	29	-	-	32
1981	Nampa, ID	39	32	37	27	38
	Tremonton, UT	33	32	33	29	42
1982	Nampa, ID	31	25	27	25	36
	Burley, ID	36	31	34	28	38
1983	Burley, ID	35	34	34	29	37
	Moses Lake, WA	32	25	32	25	39
1985	Bozeman, MT	25	24	-	24	30
	Yakima, WA	32	30	-	26	34
	Steptoe, WA	<u>27</u>	<u>28</u>	<u>-</u>	<u>22</u>	<u>34</u>
11 location average		31	29	-	-	36
6 location average (1981,1982,1983)		34	30	33	27	38

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## W I N C H E S T E R

Table I-c. Test weight in pounds per bushel of Winchester and presently grown varieties in Western Plant Breeders' spring barley trials.

<u>Year</u>	<u>Location</u>	<u>Winchester</u>	<u>Gus</u>	<u>Kombar</u>	<u>WestBred Gustoe</u>	<u>Steptoe</u>
1980	Nampa, ID	49	49	-	-	51
	Tremonton, UT	51	51	-	-	52
1981	Nampa, ID	50	49	46	50	49
1982	Conrad, MT	51	52	47	51	51
	Nampa, ID	50	48	48	51	50
	Burley, ID	51	49	45	51	49
	Merrill, OR	51	50	48	48	49
1983	Bozeman, MT	46	46	43	43	46
	Burley, ID	49	49	46	50	50
	Moses Lake, WA	49	48	47	51	49
1985	Burley, ID	51	53	-	51	51
	Yakima, WA	54	54	-	56	55
	Steptoe, WA	<u>51</u>	<u>52</u>	<u>-</u>	<u>52</u>	<u>52</u>
13 location average		50.2	50.0	-	-	50.3
8 location average (1981, 1982, 1983)		49.6	48.9	46.3	49.3	49.1

# WINCHESTER

Table I-d. Heading date of Winchester and presently grown varieties in Western Plant Breeders' spring barley trials.

<u>Year</u>	<u>Location</u>	<u>Winchester</u>	<u>Gus</u>	<u>Kombar</u>	<u>WestBred Gustoe</u>	<u>Steptoe</u>
1982	Conrad, MT	7/8	7/7	7/12	7/10	7/1
1983	Bozeman, MT	7/7	7/6	7/11	7/9	7/2

## WINCHESTER

Table I-d. Heading date of Winchester and presently grown varieties in Western Plant Breeders' spring barley trials.

<u>Year</u>	<u>Location</u>	<u>Winchester</u>	<u>Gus</u>	<u>Kombar</u>	<u>WestBred Gustoe</u>	<u>Steptoe</u>
1983	Bozeman, MT	7/7	7/6	7/11	7/9	7/2
1985	Bozeman, MT	7/6	7/5	-	7/7	6/30

## WINCHESTER

Table I-e. Agronomic data on Winchester barley grown in nurseries run by the University of California, Davis, Extension Service in 1986.

	<u>Yield</u> (lbs/ac)	<u>Test Wt.</u> (lbs/bu)	<u>1000 K</u> <u>weight</u> (grams)	<u>Plant</u> <u>Height</u> (inches)
<u>Tulelake, CA</u>				
Winchester	6300	49.8	42.0	-
Gus	6860	48.3	38.0	-
WestBred Gustoe	6840	50.8	38.8	-
Steptoe	5590	48.2	42.5	-
<u>Shasta Co., CA</u>				
Winchester	4430	54.7	41.3	-
Gus	4130	54.6	39.3	-
WestBred Gustoe	4260	54.7	39.5	-
Steptoe	5160	53.1	46.8	-
<u>Siskiyou Co., CA</u>				
Winchester	7250	53.6	39.1	26
Gus	6940	53.2	39.7	27
WestBred Gustoe	7790	54.8	38.2	23
Steptoe	6990	50.6	43.8	29

OBJECTIVE DESCRIPTION OF VARIETY  
BARLEY (*HORDEUM VULGARE*)

INSTRUCTIONS: See Reverse.

NAME OF APPLICANT(S)

Western Plant Breeders, Inc.

ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code)

8111 Timberline Drive  
Bozeman, Montana 59715

FOR OFFICIAL USE ONLY

PVPO NUMBER

8900089

VARIETY NAME OR TEMPORARY  
DESIGNATION

Winchester

Place the appropriate number that describes the varietal character of this variety in the boxes below.

Place a zero in first box (i.e.  or ) when number is either 99 or less or 9 or less.

1. GROWTH HABIT:

1 = SPRING 2 = FACULTATIVE WINTER 3 = WINTER  Early Growth: 1 = PROSTRATE 2 = SEMIPROSTRATE  
3 = ERECT

2. MATURITY (50% Flowering):

1 = EARLY (California Mariout) 2 = MIDSEASON (Betzes) 3 = LATE (Frontier)

No. of days Earlier than .....  } 1 = BETZES 2 = CALIFORNIA MARIOUT 3 = CONQUEST 4 = DICKSON  
 No. of days Later than .....  } 5 = PIROLINE 6 = PRIMUS 7 = UNITAN 8 = Steptoe

3. PLANT HEIGHT (From soil level to top of head):

1 = SEMIDWARF 2 = SHORT (California Mariout) 3 = MEDIUM TALL (Betzes) 4 = TALL (Conquest)

Cm. Shorter than .....  } 1 = BETZES 2 = CALIFORNIA MARIOUT 3 = CONQUEST 4 = DICKSON  
 Cm. Taller than .....  } 5 = PIROLINE 6 = PRIMUS 7 = UNITAN 8 = Steptoe 9 = none

4. STEM:

Exertion (Flag to spike at maturity): 1 = 0 - 3 cm. 2 = 3 - 10 cm.  Anthocyanin: 1 = ABSENT 2 = PRESENT  
3 = 10 - 15 cm.

NO. OF NODES (Originating from node above ground)

Collar Shape: 1 = CLOSED 2 = V-SHAPED 3 = OPEN  Shape of Neck: 1 = STRAIGHT 2 = SNAKY  
4 = MODIFIED CLOSED OR OPEN 3 = OTHER (Specify)

5. LEAF:

Basal leaf sheath (seedling): 1 = GLABROUS 2 = PUBESCENT  Position of flag leaf (at boot stage): 1 = DROOPING  
2 = UPRIGHT

Waxiness: 1 = ABSENT (Glossy) 2 = SLIGHTLY WAXY  MM. WIDTH (First leaf below flag leaf)  
3 = WAXY

CM. LENGTH (First leaf below flag leaf)  Anthocyanin in leaf sheath: 1 = ABSENT 2 = PRESENT

6. HEAD:

Type: 1 = TWO-ROWED 2 = SIX-ROWED  Density: 1 = LAX 2 = ERECT (Not dense)  
3 = ERECT (Dense)

Shape: 1 = TAPERING 2 = STRAP 3 = CLAVATE  Waxiness: 1 = ABSENT (Glossy) 2 = SLIGHTLY WAXY  
4 = OTHER (Specify) 3 = WAXY

Lateral Kernels Overlap: 1 = NONE 2 = AT TIP  Rachis (Hair on edge): 1 = LACKING 2 = FEW 3 = COVERED  
3 = 1/4 - 1/2 OF HEAD

7. GLUME:

Length: 1 = 1/3 OF LEMMA 2 = 1/2 OF LEMMA  Hairs: 1 = NONE 2 = SHORT 3 = LONG  
3 = MORE THAN 1/2 OF LEMMA

Hair covering: 1 = NONE 2 = RESTRICTED TO MIDDLE 3 = CONFINED TO BAND 4 = COMPLETELY COVERED

Awns: 1 = LESS THAN EQUAL TO LENGTH OF GLUMES 2 = EQUAL TO LENGTH OF GLUMES  
3 = MORE THAN EQUAL TO LENGTH OF GLUMES

Awn Surface: 1 = SMOOTH 2 = SEMISMOOTH 3 = ROUGH

## 8. LEMMA:

- ☐ 5 Awn: 1 = AWNLESS 2 = AWNLETS ON CENTRAL ROWS, AWNLESS ON LATERAL ROWS  
 3 = SHORT ON CENTRAL ROWS, AWNLETS ON LATERAL ROWS 4 = SHORT (less than equal to length of spike)  
 5 = LONG (longer than spike) 6 = HOODED
- ☐ 2 Awn Surface: 0 = AWNLESS 1 = SMOOTH 2 = SEMISMOOTH 3 = ROUGH
- ☐ 1 Teeth: 1 = ABSENT 2 = FEW 3 = NUMEROUS ☐ 1 Hair: 1 = ABSENT 2 = PRESENT
- ☐ 1 Shape of base: 1 = DEPRESSION 2 = SLIGHT CREASE  
 3 = TRANSVERSE CREASE ☐ 2 Rachilla Hairs: 1 = SHORT 2 = LONG

## 9. STIGMA:

- ☐ 2 Hairs: 1 = FEW 2 = MANY

## 10. SEED:

- ☐ 2 Type: 1 = NAKED 2 = COVERED ☐ 1 Hairs on Ventral Furrow: 1 = ABSENT 2 = PRESENT
- ☐ 3 Length: 1 = SHORT (8.0 mm.) 2 = SHORT TO MIDLONG (7.5 - 9.0 mm.) 3 = MIDLONG (8.5 - 9.5 mm.)  
 4 = MIDLONG TO LONG (9.0 - 10.5 mm.) 5 = LONG (10.0 mm.)
- ☐ 4 Wrinkling of hull: 1 = NAKED 2 = SLIGHTLY WRINKLED 3 = SEMIWRINKLED 4 = WRINKLED
- ☐ 1 Aleurone Color: 1 = COLORLESS (White or Yellow) 2 = BLUE
- ☐ 0 ☐ 3 PERCENT ABORTIVE ☐ 4 ☐ 2 GMS. PER 1000 SEEDS

## 11. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

- ☐ 1 SEPTORIA ☐ 1 NET BLOTCH ☐ 1 SPOT BLOTCH ☐ 0 POWDERY MILDEW
- ☐ 1 LOOSE SMUT ☐ 1 BACTERIAL BLIGHT ☐ 2 COVERED SMUT ☐ 1 FALSE LOOSE SMUT
- ☐ 1 STEM RUST ☐ 1 LEAF RUST ☐ 1 SCAB ☐ 2 SCALD
- ☐ 1 AY ☐ 1 BSMV ☐ 2 BYDV ☐ 1 OTHER (Specify)

## 12. INSECT: (0 = Not tested, 1 = Susceptible 2 = Resistant)

- ☐ 0 GREEN BUG ☐ 0 ENGLISH GRAIN APHID ☐ 0 CHINCH BUG ☐ 0 ARMYWORM
- ☐ 0 GRASS HOPPERS ☐ 0 CERIAL LEAF BETTLE ☐ 0 OTHER (Specify)
- HESSIAN FLY RACES } ☐ 0 GP ☐ 0 A ☐ 0 B ☐ 0 C  
☐ 0 D ☐ 0 E ☐ 0 F ☐ 0 G

## 13. CHEMICAL (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

- ☐ 0 DDT ☐ 0 OTHER (Specify)

## 14. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	Gus	Seed size	Kombar
Leaf size	Gus	Coleoptile elongation	Gus
Leaf color	Kombar	Seedling pigmentation	Gus
Leaf carriage	kombar		

REFERENCES: The following publications may be used as a reference aid for the standardization of character descriptions and terms used in this form:

1. Wiebe, G. A., and D. A. Reid, 1961, Classification of Barley Varieties Grown in the United States and Canada in 1958, Technical Bulletin No. 1224, U.S. Dept. of Agriculture.
2. Reid, D. A., and G. A. Wiebe, 1968, Barley: Origin, Botany, Culture, Winter Hardiness, Genetics, Utilization, Pests, Agriculture Handbook No. 338, U.S. Dept. of Agriculture. pp. 61 - 84.
3. Malting Barley Improvement Association, Milwaukee, Wisconsin, 1971, Barley Variety Dictionary.

COLOR: Nickerson's or any recognized color fan may be used to determine color of the described variety.



FOOD PRODUCTION AND INSPECTION BRANCH  DIRECTION GÉNÉRALE PRODUCTION ET INSPECTION DES ALIMENTS	DATE  March 11, 1987	2677
	SECTION  SEED DIVISION	
RE OBJET  DESCRIPTION OF VARIETY		

Crop: Six-row spring barley  
(Hordeum vulgare)

Registration No.: 2677

Variety: Winchester

Date Registered: July 11, 1986

Origin and Breeding:

Winchester, a six-row feed barley, was developed by Western Plant Breeders, Bozeman, Montana. This variety was selected from the cross Gus x Kombar, both of which are semi-dwarf varieties. A single spike was selected from an F<sub>3</sub> plant and propagated as a head row. A modified bulk pedigree method was followed and 90 uniform F<sub>10</sub> plant plots were bulked to form breeder seed. Selection criteria were plant height, lodging resistance, uniform heading date, good disease resistance and high yield. Winchester was tested as BT 914 and BFC 78-40.

Varietal Characteristics:

Plant Characteristics:

Juvenile growth habit: intermediate  
 Coleoptile colour: green  
 Flag leaf: dark green; medium width and length; upright; white  
     auricles; waxy bloom on sheath  
 Leaves: dark green; medium width and length; glabrous sheath and blade  
 Stems: bluish green with waxy bloom; medium thickness; straight neck  
     with closed collar; stem exsertion of 3-10 cm  
 Heading: mid-season  
 Maturity: slightly earlier than Samson; slightly later than Bonanza  
 Plant height: short; shorter than Samson  
 Resistance to shattering: fair  
 Resistance to neck breaking: good  
 Resistance to straw breaking: good  
 Drought tolerance: poor  
 Disease reaction: resistant to scald (Rhynchosporium secalis) and  
     surface-borne smuts (Ustilago hordei and U. nigra); moderately  
     resistant to moderately susceptible to common root rot  
     (Helminthosporium sativum), bacterial blight (Xanthomonas  
     translucens) and net blotch (Helminthosporium teres); susceptible  
     to stem rust (Puccinia graminis), loose smut (Ustilago nuda) and  
     Septoria blotch (Septoria passerinii)

- 2 -

Spike Characteristics:

Type: six-rowed  
Shape: strap; medium to dense; medium length; kernels overlap at tip  
Attitude: semi-nodding  
Lemma: glabrous; long semi-smooth awns with green tips; green veins  
Glume: long; completely covered with short hairs; long rough awn with green tip  
Rachis: numerous short hairs on edges; tapered segments

Kernel Characteristics:

Size: medium length and width; medium to large size  
Aleurone: yellow  
Rachilla: medium length; no abnormal rachillas; long hairs; few barbs on lateral veins  
Basal marking: horseshoe depression  
Quality: poor malting quality  
Protein content: intermediate  
1000 kernel weight: high; similar to Diamond

Performance and Adaptation:

Winchester is a semi-dwarf, six-rowed feed barley which is resistant to surface borne smuts and to scald. It is high yielding under high levels of fertility and good management. Winchester is best adapted to high rainfall areas of central and northern Alberta and irrigated land in southern Alberta where lodging and straw volume are problems. Because of its susceptibility to loose smut, seed should be treated with the appropriate fungicide. It is also recommended that production of Winchester be limited to the western prairie due to its susceptibility to rust.

Maintenance of Breeder Seed: Western Plant Breeders, Bozeman, Montana

Canadian Distributors: Alberta, Saskatchewan and Manitoba Wheat Pools

Supported by: Expert Committees on Grain Breeding and Grain Diseases

PD/lr  
6040S

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Experimental Data:Table 1: Agronomic performance<sup>1</sup> of Winchester and Check Varieties, Western Co-operative Six-Row Barley Tests 1983-1985.

<u>Variety</u>	<u>Year</u>	<u>Yield</u> (kg/ha) (9)**	<u>Height</u> (cm) (9)	<u>Lodging</u> (1-9)* (7)	<u>Days to</u> <u>Maturity</u> (9)	<u>1000 K</u> <u>Weight</u> (g) (6)	<u>Test</u> <u>weight</u> (kg/hl) (9)
OAC 21	1983	3451	102.6	3.72	88.0	34.67	54.71
Bonanza		4836	96.6	3.10	89.1	35.76	56.48
Diamond		5094	84.0	2.50	90.0	39.75	52.71
Samson		4577	76.4	1.39	94.0	34.46	55.57
Winchester		4673	71.9	1.96	90.5	39.35	54.27
OAC 21	1984	2708	93.0	3.7	85.1	37.5	56.6
Bonanza		3579	89.7	4.0	84.7	37.6	58.2
Diamond		3980	76.5	2.0	84.8	43.3	55.9
Samson		3552	69.0	2.6	87.4	36.5	57.1
Winchester		3552	60.4	2.5	86.8	42.7	56.8
OAC 21	1985	3290	92.5	6.2	93.5	37.7	58.7
Bonanza		4600	89.1	2.9	94.3	38.7	60.8
Diamond		5140	81.3	3.9	94.0	45.7	60.0
Winchester		4910	64.1	2.0	95.8	43.9	59.6

\* 1-9; 1=best resistance

\*\* numbers in parentheses indicate station years

<sup>1</sup> Locations were: Brandon, Glenlea, Melfort, Indian Head, North Battleford, Morden, Portage La Prairie, Saskatoon, Regina, Scott, Lethbridge, Watrous, Lacombe, Calmar, Vermilion, Evansburg, Olds, Beaverlodge, Fort Vermilion, Swift Current, Trochu and Thunder Bay

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Table 2: Yield Performance (kg/ha) of Winchester and Check Varieties, Western Co-operative Six-row Barley Tests, 1983-1985.

Variety	Black Soil Zone					Brown and Dark Brown Soil Zone					Black and Grey Soil Zone					Peace River					Overall Mean			
	Bran	Glen	InHd	Melf	Mord	NoBa	Port	Mean	Leth	Reg	Sask	Scot	SwCu	Matr	Mean	CalM	Laco	Troc	Evan	Olds		Mean	Beav	FtVm
1983																								
OAC 21	4714	4897	3814	2988	-	-	-	4103	3821	3377	3654	1948	-	-	3200	3410	4238	3157	-	-	3602	3168	-	3599
Bonanza	6343	6044	5165	3320	-	-	-	5218	5795	4971	4829	2529	-	-	4529	5852	5020	4816	-	-	5229	5059	-	4979
Diamond	5595	6256	4516	4024	-	-	-	5098	6414	5599	5283	2858	-	-	5038	4930	5530	5578	-	-	5346	5975	-	5213
Samson	5353	5394	4438	3147	-	-	-	4583	6019	5199	4268	2299	-	-	4445	5898	4454	3977	-	-	4776	5231	-	5038
Winchester	4961	5179	4615	3222	-	-	-	4495	6135	4323	4467	2545	-	-	4368	4558	4710	5653	-	-	4974	5425	-	4655
1984																								
OAC 21	4202	4206	3721	3377	4433	1537	3936	3633	4210	1711	1666	2281	1433	1843	2191	-	-	-	-	-	-	-	-	2889
Bonanza	5197	4930	4360	4227	5495	2226	4167	4372	5159	2554	2588	3272	2231	2473	3046	-	-	-	-	-	-	-	-	3760
Diamond	5274	5986	4706	4488	5583	1893	4781	4673	5973	3264	2604	3321	2320	3381	3477	-	-	-	-	-	-	-	-	4121
Samson	4780	5977	4004	3965	5449	1748	3751	4239	6099	2682	2143	2768	1678	1105	2746	-	-	-	-	-	-	-	-	3550
Winchester	5045	4861	4137	3584	4956	2436	4185	4172	5749	2555	2791	3881	1933	3096	3241	-	-	-	-	-	-	-	-	3785
1985																								
OAC 21	4806	6630	5003	4428	3071	2270	3266	4225	3926	2443	3873	1059	-	911	2427	4937	3900	-	2286	1500	2427	2175	2632	3286
Bonanza	5550	7736	6707	5991	4031	3589	5402	5565	7742	4268	4089	1882	-	4335	4501	4651	5299	-	2466	2823	4501	3346	2941	4610
Diamond	5875	9355	7129	6254	4059	4391	5707	6131	8643	4579	4678	2037	-	4958	5026	6004	5420	-	2772	3013	5026	4072	3702	5168
Winchester	5766	8124	6856	6071	3970	4412	4701	5716	8720	4612	3784	2053	-	5232	4924	6958	5248	-	1967	3101	4924	3280	3254	4914

Table 3: Disease reaction of Winchester and Check Varieties, Western Co-operative Six-Row Barley Tests, 1983-1985.

Variety	% Common Root Rot		% Smut Infected Plants			Net Blotch*			Scald	Septoria	Rust**
	Saskatoon	Scott	U. nuda	U. hordei	U. nigra	102	858	857	837	692	(composite)
1983											
Bonanza	88	61	61	12	14	S	S	MR-MS	MS	S	60 MR-MS
Diamond	76	96	5	1	0	MR	MS	MS	MS	R	30 MR
Samson	74	36	70	6	5	S	S	S	S	S	70 MS-S
Winchester	86	59	80	3	3	MS-S	MR-MS	MR	R	S	90 S
1984											
Bonanza	70	87	59	27	20	9	8	5	S	S	Stem rust
Diamond	91	90	54	1	0	10	9	7	MS	R	30 R-MR
Samson	73	61	67	13	9	10	8	7	S	S	20 R-MR
Winchester	86	74	97	2	5	10	4	7	MR	S	30 MR-MS
											80 S
1985											
Bonanza	24	45	57	13	12	9	9	5	S	S	Composite
Diamond	59	93	59	0	1	7	5	7	MS	R	Stem rust
Winchester	38	57	100	5	4	9	7	5	R	S	15 MR
											10 MR
											70 S

\* 1984 and 1985 rating scale 1-10; 10 is severe.

\*\* Reaction measured as percent of surface involved and in the following classes: R = resistant, MR = moderately resistant, MS = moderately susceptible and S = susceptible.

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Table 4: Feed Analysis<sup>1</sup> of Winchester and Check Varieties, Western Cooperative Six-Row Barley Tests, 1984-1985.

Variety	% Protein		% Fibre		Digestible Energy*		Total Digestible Energy (%)	
	1984	1985	1984	1985	1984	1985	1984	1985
Bonanza	13.5	14.1	5.9	5.3	1.53	1.36	1.45	67.9
Diamond	11.6	13.8	7.8	6.8	1.51	1.36	1.44	67.8
Samson	12.0	11.3	7.9	6.9	1.49	1.35	1.42	67.4
Winchester	12.1	13.2	7.3	6.1	1.49	1.36	1.43	68.2

<sup>1</sup> 1984 Feed Analysis done by Alberta Soil and Feed Testing Laboratory, Edmonton, Alberta  
 1985 Feed Analysis done by Norwest Laboratories, Edmonton, Alberta

\* Expressed on Mcal per pound as feed basis

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